

AD-A214 809

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1200, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

2

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	March 1983	Final ()
4. TITLE AND SUBTITLE		5. FUNDING NUMBERS
THE CHEMISTRY OF ANTIOXIDANT IN SOLID ROCKET PROPELLANTS		61102F 2303/B2
6. AUTHOR(S)		7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Joseph Chiang		State University of New York Chemistry Department Oneonta, NY 13820
8. PERFORMING ORGANIZATION REPORT NUMBER		NYCOK-FW H-11-1479
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER
AFOSR BLDG 410 BAFB DC 20332-6448		AFOSR-81-0095

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

DTIC
ELECTE
DEC 01 1989
S D
D&

14. SUBJECT TERMS	15. NUMBER OF PAGES		
	3		
16. PRICE CODE			
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified		

NSN 7540-01-280-5500

Standard Form 298 (890104) (Rev. 10-89)
Prescribed by ANSI Std. Z39-18

89 11 039

FINAL REPORT

AFOSR-81-0095

THE CHEMISTRY OF ANTIOXIDANT IN SOLID ROCKET PROPELLANTS

Dr. Joseph Chiang
Chemistry Department
State University of New York
Oneonta, NY 13820

March 1983

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	



In this mini grant, the project director has focused his effort on the study of the propellant UPP. The composition of UPP is listed as follows:

CTBN- Carboxy-terminated butadieneacrylonitrile,

PTECA- C(COOH)₄,

HX-868- Methylaziridine phthalate,

TMETN- Trimethyloethane trinitrate,

NMNA- N-nitroso-N-methyl-p-nitroaniline,

HMX- Cyclotetramethylene tetranitramine,

AP- Ammonium Perchlorate,

Al-Aluminium.

First attempt was to extract N-nitroso-N-methyl-p-nitroaniline (NMNA) from UPP by various solvents: benzene, carbon tetrachloride, methylene chloride, chloroform and dichloroethyl ether. At various experimental stages, we tried the above-mentioned solvents at different concentrations: 95-99%. As compared with the previous studies of N-methyl-p-aniline (MNA), NMNA did not produce a peak due to the N-H at the methyl carbon in MNA by Fourier transformation infrared spectra. This led us to search for a unique peak in NMNA spectra. Using MNA and (CH₃)₂NNO as a starting point, the appearance of a peak at 3453 cm⁻¹ of MNA and disappearance of that peak in (CH₃)₂NNO

gave us the clue for an N-O peak search.

The propellant UPP for analysis was sliced into a thickness of 50 microns and was dissolved in benzene, carbon tetrachloride, methylene chloride, chloroform, dichloroethane, and diethyl ether. About 5.0 grams of the sliced sample was used for the solution. Soxhlet extraction apparatus was assembled with 250 ml flask. Extraction thimble size 22x80mm was used to contain the propellant in a Soxhlet extraction tube. A total volume of 100 ml solvent was used for each solvent extraction. The temperature of extraction has been varied from room temperature to 70°C for a period of 8 to 24 hours.

The extract was evaporated to nearly dryness and the residue was re-dissolved by various solvents. Spectra were taken on the solution. A distinct peak at 3019 cm⁻¹ is characteristic of NMNA.

An approach to this problem is to study the structure of NMNA. The project director and his undergraduate student research collaborators will continue this project. They propose an X-ray crystallographic study of this molecule during the summer of 1983 in order to determine the geometry and to study the microspectroscopic of NMNA.